

THAT WHICH IS CLAIMED IS:

1. A phased array antenna comprising:
a substrate having a first surface, and a
second surface adjacent thereto and defining an edge
therebetween; and
5 a plurality of dipole antenna elements on the
first surface and at least a portion of at least one
dipole antenna element on the second surface, each dipole
antenna element comprising
a medial feed portion and a pair of legs
10 extending outwardly therefrom, and
adjacent legs of adjacent dipole antenna
elements including respective spaced apart end
portions having predetermined shapes and
relative positioning for providing increased
15 capacitive coupling between the adjacent dipole
antenna elements.
2. A phased array antenna according to Claim
1 further comprising a load connected to the medial feed
portion of said at least one dipole antenna element
having at least a portion thereof on the second surface.
3. A phased array antenna according to Claim
2 wherein said load comprises a resistive load.
4. A phased array antenna according to Claim
1 further comprising respective feed lines connected to
said plurality of dipole antenna elements on the first
surface.

5. A phased array antenna according to Claim 1 further comprising a ground plane adjacent said plurality of dipole antenna elements; and wherein said at least one dipole antenna element having at least a portion thereof on the second surface is connected to said ground plane.

6. A phased array antenna according to Claim 5 wherein the phased array antenna has a desired frequency range; and wherein said ground plane is spaced from the first surface less than about one-half a wavelength of a highest desired frequency.

7. A phased array antenna according to Claim 1 wherein the second surface is orthogonal to the first surface.

8. A phased array antenna according to Claim 1 wherein said substrate has a generally rectangular shape having a top surface defining the first surface, and first and second pairs of opposing side surfaces defining the second surface.

9. A phased array antenna according to Claim 1 wherein each leg comprises:
an elongated body portion; and
an enlarged width end portion connected to an end of the elongated body portion.

10. A phased array antenna according to Claim 1 wherein the spaced apart end portions in adjacent legs comprise interdigitated portions.

11. A phased array antenna according to Claim
10 wherein each leg comprises:
an elongated body portion;
an enlarged width end portion connected to an
5 end of the elongated body portion; and
a plurality of fingers extending outwardly from
said enlarged width end portion.

12. A phased array antenna according to Claim
1 wherein the phased array antenna has a desired
frequency range; and wherein the spacing between the end
portions of adjacent legs is less than about one-half a
5 wavelength of a highest desired frequency.

13. A phased array antenna according to Claim
1 wherein said plurality of dipole antenna elements
comprises first and second sets of orthogonal dipole
antenna elements to provide dual polarization.

14. A phased array antenna according to Claim
1 wherein each dipole antenna element comprises a printed
conductive layer.

15. A phased array antenna according to Claim
1 wherein said plurality of dipole antenna elements are
sized and relatively positioned so that the phased array
antenna is operable over a frequency range of about 2 to
5 30 GHz.

16. A phased array antenna according to Claim
1 wherein said plurality of dipole antenna elements are
sized and relatively positioned so that the phased array

antenna is operable over a scan angle of about 60
5 degrees.

17. A phased array antenna according to Claim
1 further comprising a respective impedance element
electrically connected between the spaced apart end
portions of adjacent legs of adjacent dipole antenna
5 elements for further increasing the capacitive coupling
therebetween.

18. A phased array antenna according to Claim
1 further comprising a respective printed impedance
element adjacent the spaced apart end portions of
adjacent legs of adjacent dipole antenna elements for
5 further increasing the increased capacitive coupling
therebetween.

19. A phased array antenna comprising:
a substrate having a first surface, and at
least a pair of second surfaces adjacent thereto and
defining respective edges therebetween;
5 a plurality of dipole antenna elements on the
first surface and the second surfaces, each dipole
antenna element comprising a medial feed portion and a
pair of legs extending outwardly therefrom; and
a respective load connected to the medial feed
10 portion of said plurality of dipole antenna elements on
the second surfaces.

20. A phased array antenna according to Claim
19 wherein said load comprises a resistive load.

21. A phased array antenna according to Claim
19 further comprising a ground plane adjacent said
plurality of dipole antenna elements; and wherein each
dipole antenna element comprising a load connected to the
5 medial feed portion thereof is also connected to said
ground plane.

22. A phased array antenna according to Claim
21 wherein the phased array antenna has a desired
frequency range; and wherein said ground plane is spaced
from the first surface of said substrate less than about
5 one-half a wavelength of a highest desired frequency.

23. A phased array antenna according to Claim
19 wherein each leg comprises:
an elongated body portion; and
an enlarged width end portion connected to an
5 end of the elongated body portion.

24. A phased array antenna according to Claim
19 wherein adjacent legs of adjacent dipole antenna
elements on the first and second surfaces include
respective spaced apart end portions having predetermined
5 shapes and relative positioning for providing increased
capacitive coupling between the adjacent dipole antenna
elements.

25. A phased array antenna according to Claim
24 wherein the spaced apart end portions in adjacent legs
comprise interdigitated portions.

26. A phased array antenna according to Claim
22 further comprising a respective impedance element
electrically connected between the spaced apart end
portions of adjacent legs of adjacent dipole antenna
5 elements for further increasing the capacitive coupling
therebetween.

27. A phased array antenna according to Claim
22 further comprising a respective printed impedance
element adjacent the spaced apart end portions of
adjacent legs of adjacent dipole antenna elements for
5 further increasing the increased capacitive coupling
therebetween.

28. A method of making a phased array antenna
on a substrate having a first surface, and a second
surface adjacent thereto and defining an edge
therebetween, the method comprising:
5 forming a plurality of dipole antenna elements
on the first surface and at least a portion of at least
one dipole antenna element on the second surface;
each dipole antenna element comprising a medial
feed portion and a pair of legs extending outwardly
10 therefrom, and adjacent legs of adjacent dipole antenna
elements on the first and second surfaces including
respective spaced apart end portions having predetermined
shapes and relative positioning for providing increased
capacitive coupling between the adjacent dipole antenna
15 elements.

29. A method according to Claim 28 further
comprising connecting a load to the medial portion of the

at least one dipole antenna element having at least a portion thereof on the second surface.

30. A method according to Claim 29 wherein the load comprises a resistive load.

31. A method according to Claim 29 further comprising:

forming a ground plane adjacent the plurality of dipole antenna elements; and

5 connecting the at least one dipole antenna element having at least a portion thereof on the second surface to the ground plane.

32. A method according to Claim 31 wherein the phased array antenna has a desired frequency range; and wherein the ground plane is spaced from the first surface less than about one-half a wavelength of a highest
5 desired frequency.

33. A method according to Claim 31 wherein the substrate has a generally rectangular shape having a top surface defining the first surface, and first and second pairs of opposing side surfaces defining the second
5 surface.

34. A method according to Claim 28 wherein forming the plurality of dipole antenna elements comprises forming each leg with an elongated body portion, and an enlarged width end portion connected to
5 an end of the elongated body portion.

35. A method according to Claim 28 wherein shaping and positioning respective spaced apart end portions comprises forming interdigitated portions.

36. A method according to Claim 28 wherein forming the plurality of dipole antenna elements comprises forming first and second sets of orthogonal dipole antenna elements to provide dual polarization.

37. A method according to Claim 28 further comprising electrically connecting a respective impedance element between the spaced apart end portions of adjacent legs of adjacent dipole antenna elements for further
5 increasing the capacitive coupling therebetween.

38. A method according to Claim 28 further comprising positioning a respective printed impedance element adjacent the spaced apart end portions of adjacent legs of adjacent dipole antenna elements for
5 further increasing the increased capacitive coupling therebetween.